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(71) Applicant(s)
Ian Alfred Chamings
Higher House, Kingscott, TORRINGTON, Devon,
EX38 7JJ, United Kingdom

(72) Inventor(s)
Ian Alfred Chamings

(74) Agent and/or Address for Service
Ian Alfred Chamings
Higher House, Kingscott, TORRINGTON, Devon,
EX38 7JJ, United Kingdom

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(56) Documents Cited
EP 0944034 A1   EP 0932157 A1
FR 002752323 A

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(54) Abstract Title
Computer aided music mixing system

(57) According to the present invention there is provided a method which stores information such as tempo, introductory section length and concluding section length about pieces of beat orientated music such as dance music, and using this information automatically mixes together dance music songs. This has the advantage of requiring only one human interaction for each song, after which the song can be used in mixes with any other music for which similar information has also been stored.
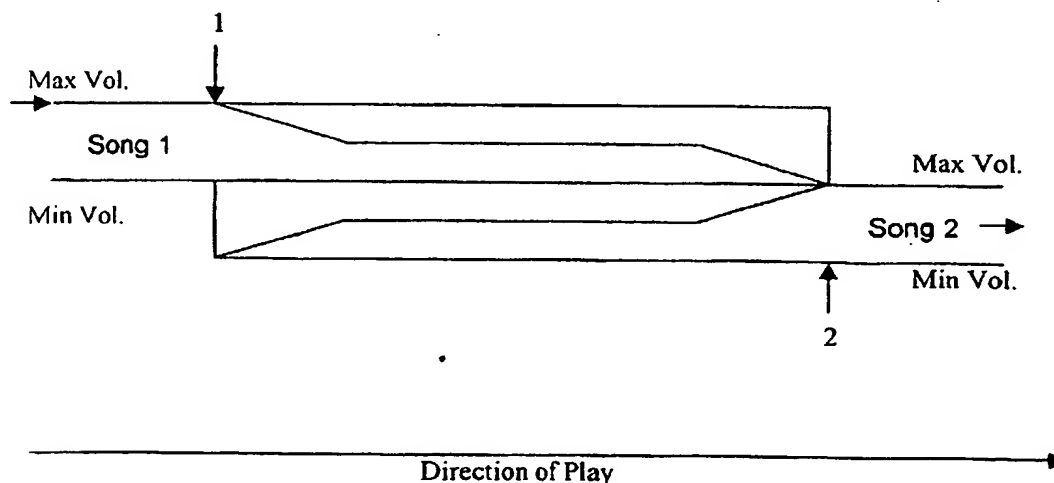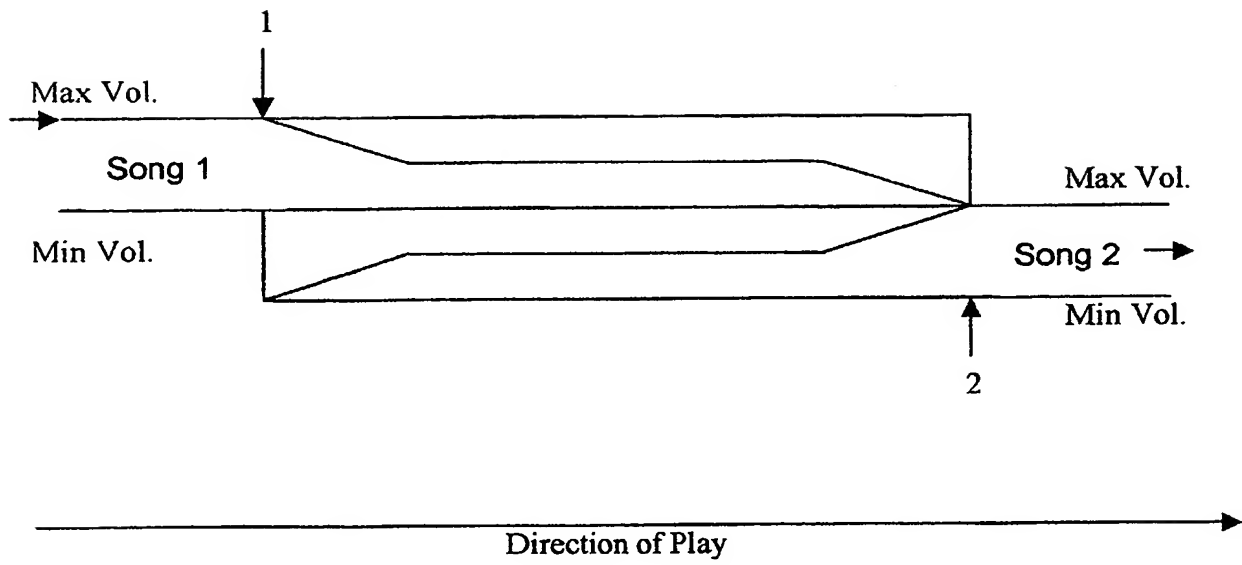
Figure 1

Max Vol.

Song 1

Min Vol.

Max Vol.

Song 2 →

Min Vol.

Direction of Play

Figure 1

Computer Aided Music Mixing System

This invention relates to the field of playing music using an automated system. More specifically to mixing, that is beat-matching and simultaneously playing, pieces of beat

5   orientated music, for example Dance music.

A system of playing pieces of music in sequence is well known in the art, for example a "Jukebox" machine. However, conventional systems are not capable of overlapping the pieces of music in a way which forms true continuous music, that is to say music wherein the

10   beats and timing between the beats remains constant.

It is also known in the art a system which allows a user to enter information about a first piece of music, and then enter information about a second piece of music, and the system uses this information to alter the speed of at least one of the pieces of music to be the same as

15   the other piece of music. However, the user then has to provide input as to how the pieces of music are to be overlapped for each mix. An example of this system is EarJam IMP from Earjam.com

It is also known in the art systems which automatically senses the tempo of pieces of music.

20   An example of this is Cool Edit Pro by Syntrillium Software. However, these systems are unreliable.

It is also known in the art systems which allow pieces of sound to be placed chronologically (sequenced) and then played. An example of such a system is Cool Edit Pro by Syntrillium

25   Software.

A disadvantage of all of the above systems is that for one piece of music to be mixed into another, human interaction is required each time a mix is made, either to assess the tempo of the music, or the length of time which the pieces of music have to overlap, or both.

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It is also known in the art to manually mix pieces of music together by adjusting the tempo of each piece as necessary and analysing the pieces of music to find where to overlap them. An example of this is a Club Disc Jockey.

According to a first aspect of the present invention there is provided a method of playing pieces of music simultaneously comprising the steps of :

recording each piece of music in to a computer system;

analysing each piece of music to identify the tempo and recording this information on

5   the computer system;

analysing each piece of music to determine the size of at least one of the introductory section and the concluding section and recording this information on the computer system;

using the computer system to automatically play pieces of music so that they overlap in a manner to provide continuous music by adjusting the playing speed of each piece and the

10   amount that the pieces overlap accordingly using the information provided.

According to a second aspect of the invention there is provided a method of playing pieces of music simultaneously comprising the steps of:

recording each piece of music to a computer system;

15   analysing each piece of music to determine the size of at least one of the introductory section and the concluding section and recording this information on the computer system;

analysing each piece of music to determine the tempo;

adjusting the tempo by an amount determined by the original tempo, such that the new tempo is the same as a predetermined tempo; and

20   using the computer system to play pieces of music so that they overlap in a manner to provide a continuing piece of music using the information provided.

According to an embodiment of the present invention there is provided a music mixing method which allows users to select from a number of pieces of music from a list which have

25   already been assessed as described in the above methods. The system will then sequence the pieces of music in a manner to provide continuous, beat-matched music. This has the advantage of allowing mixes of all assessed songs after only one human interaction per song.

With reference to the drawing a preferred embodiment will now be discussed. Figure 1 shows

30   a graphical depiction of a piece of music. This system allows songs to be automatically mixed together after each song has been reviewed once and extra information is stored as data on a computer system.

Each song is assessed to find its speed. This is done by using any music software capable of

playing and displaying music.

The song is also assessed musically. The first 'simple music' section, or "introductory section", which comprises normally of percussion (and occasionally very small amounts of
5 vocals or bass), is timed and recorded in bars, or other suitable nomenclature, and the position of the point where the introduction section breaks into more complicated music 2 is also recorded. Similarly, information regarding the last 'simple music' section , or "concluding section" is also recorded, but includes the point where the more complicated music breaks into simple music 1.
10

These pieces of information are then allocated to the music file. This is done in one of two ways:

1. By attaching this data to the software file representing the music. This creates a new file
15 including the data representing the music, the data representing the speed, the point where the first percussion only section ends and where the last percussion only section begins.

2. This extra information can also be stored separately from the music file, and can be accessed by the playing software on recognition of the music file.
20

A piece of software capable of playing two music files at the same time, and able to alter the speed of the tracks and the volume which it is played, is enhanced to be able to read the extra information. The software reads the extra data provided previously, and plays the music accordingly, i.e. the second song is started at the point where the last section of the first song
25 begins. The initial volume level of the second song is silent. The last section of the first song is faded out as the first section of the new song is faded in, in a suitable envelope.

Example Mix:
30
    (1)   DJ Supreme "Tha Wildstyle", Distinctive Records © 1996 and

    (2)   Subliminal Cuts "Le .voie le soliel", XL Recordings Ltd © 1996

Speed of (1)   28.669 seconds for 32 beats

Speed of (2)   14.431 seconds for 16 beats, so for 32 beats: 28.862

In this example, (1) will be played first, at original speed.

Speed required for (2) is calculated to be sped up by 1.006 times.

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Cue Points

Point where (1) enters simple music only (in this case percussion accompanied by bass): - 43.325 seconds.

10   Point where (2) leaves simple music: +43.325 seconds.

If there are a different number of beats (grouped in to bars) then the following steps are applied:

15   If there is a longer introduction section in the second song than the concluding section in the first song: The last beat of the last complete bar in the last section of first song is matched with the last beat in the first section of the second song. The second track is silenced until the concluding section of the first song is begun, at which time the envelopes (the changes of the volumes of the songs) are altered.

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If there is a longer concluding section in the first song than the introduction section in second song: The last beat of the last complete bar of the last section of the first song is matched with the last beat of the first section of the second song. The envelopes of the two songs (the changes of the volumes of the songs) are only changed when the second song

25   begins.

If the final beat of a piece of music is the start of a new bar (in 4/4 timing) then this is discounted during analysis.

30   The last point of each section is defined by the instant directly before the first beat of the first bar which is not completely inside the section.

CLAIMS

1.   A method of playing pieces of music simultaneously comprising the steps of :

recording each piece of music in to a computer system;

analysing each piece of music to identify the tempo and recording this information on the computer system;

analysing each piece of music to determine the size of at least one of the introductory section and the concluding section and recording this information on the computer system;

using the computer system to automatically play pieces of music so that they overlap in a manner to provide continuous music by adjusting the playing speed of each piece and the amount which the pieces overlap accordingly using the information provided.

2.   A method of playing pieces of music simultaneously comprising the steps of:

recording each piece of music to a computer system;

analysing each piece of music to determine the size of at least one of the introductory section and the concluding section and recording this information on the computer system;

analysing each piece of music to determine the tempo;

adjusting the tempo of the piece of music such that the new tempo is the same as a predetermined tempo; and

using the computer system to play pieces of music so that they overlap in a manner to provide a continuing piece of music using the information provided.

3.   A method as claimed in claims 1 or 2 wherein said step of recording the pieces of music to a computer system is achieved by converting an analogue sound signal from a playing medium to a software format.

4.   A method as claimed in claims 1 or 2 wherein the tempo is determined by viewing a graphical illustration of a sound wave and noting the time between a number of beats.

5.   A method as claimed in any of the preceding claims, wherein the system allows users to select the pieces of music from a list on an internet site.

6.   A method as claimed in any of the preceding claim, wherein the introductory section

is further segmented to sections of different melodic content.

7.   A method as claimed in any of the preceding claim, wherein the concluding section is further segmented to sections of different melodic content.

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8.   A method as claimed in any of the preceding claims wherein the extra musical information is stored separately in the computer system.

9.   A method as claimed in any of claims 1 to 8 wherein the extra musical information is

10   stored as an addition to the relevant music file.

10.   A method as claimed in any of the preceding claims wherein the piece of music is altered to provide the sections as described above.

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Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.S): G5J (JESS) G5R (RAC, RGB, RPC2, RB72, RB73)
Int Cl (Ed.7): G10H 1/00 1/40 G11B 27/00, 27/10
Other: Online: WPI; EPODOC; JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	EP 0944034 A1 (PIONEER)	1, 2
A	EP 0932157 A1 (DEUTSCHE THOMSON-BRANDT)	1, 2
A	FR 2752323 A1 (PERILLE)	1, 2

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